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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,978	02/18/2004	Hardayal Singh Gill	HIT1P069/HSJ920030276US1	1677

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EXAMINER
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KLIMOWICZ, WILLIAM JOSEPH

ART UNIT	PAPER NUMBER
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2627

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/780,978

**Applicant(s)**

GILL, HARDAYAL SINGH

**Examiner**

William J. Klimowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-14 and 17-21 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 13 contains the same limitation as set forth in independent claim 11 (i.e., “a spacer layer of Cr positioned between the free layer and the AP pinned layer structure.”)

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. (US 2005/0111148 A1).

As per claim 1 (and also claim 11, rejected, *infra*), Li et al. (US 2005/0111148 A1) discloses a magnetic head (e.g., FIG. 2), comprising: a free layer (10); an antiparallel (AP) pinned layer structure (48) spaced apart from the free layer (10), the AP pinned layer structure

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(48) includes at least two Fe-containing pinned layers (50, 54 - see paragraph [0024] - lines 20 and 29 - having magnetic moments that are self-pinned antiparallel to each other (via layer (52)), the pinned layers (50, 54) being separated by an AP coupling layer (52) of Cr - see paragraph [0024] - line 27; and a high coercivity layer (46 - PtMn, which is a high coercivity material) positioned towards the AP pinned layer structure (48) on an opposite side thereof relative to the free layer (10), the high coercivity structure (46) pinning a magnetic orientation of the AP pinned layer structure.

As per claim 2, wherein the free layer (10) includes a layer of Fe - see paragraph [0024], lines 49-50.

As per claim 3, wherein the free layer (10) further includes a layer of NiFe see paragraph [0024], lines 53-54.

As per claim 8, wherein the head forms part of a GMR head - see title of Li et al. (US 2005/0111148 A1).

As per claim 9, wherein the head forms part of a CPP GMR sensor - see title of Li et al. (US 2005/0111148 A1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 10-14 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2005/0111148 A1).

See the description of Li et al. (US 2005/0111148 A1), *supra*.

As per claims 5 and 14, the spacer layer (20) has a thickness of between about 15 and 25 Angstroms - see paragraph [0024].

As per claim 12, see the rejection of claim 2, *supra*.

As per claim 17, see the rejection of claim 8, *supra*.

As per claim 18, see the rejection of claim 9, *supra*.

As per claims 4, 11 and 13, although Li et al. (US 2005/0111148 A1) does not expressly disclose wherein the spacer layer (20) between the free layer (10) and the AP pinned layer structure (48) includes Cr, (Li et al. (US 2005/0111148 A1) discloses Cu), or as per claims 10 and 19, wherein the head is a tunnel valve head sensor, Official notice is taken that chromium spacer layers or wherein the spacer layer is a barrier layer of the type used in a CPP tunnel head, used in CPP magnetoresistive heads are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the spacer layer (20) of Li et al. (US 2005/0111148 A1) as being formed of Cr, in lieu of Cu, as is known, or a tunnel barrier layer, used in a tunnel valve head.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the spacer layer (20) of Li et al. (US 2005/0111148 A1) as being formed of Cr, in lieu of Cu, as is known in the art, in order to provide a material having a smooth surface (Cr), while

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providing a material that has a better adhesion than copper (though copper is generally less expensive and has a higher conductivity); moreover still, the use of either conductor chromium or copper is seen to be no more than an obvious design choice, based on the known advantages and disadvantages of each conductor coating; copper and chromium, and used in this context as a conductive layer, are thus seen to be art recognized equivalents.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the spacer layer (20) of Li et al. (US 2005/0111148 A1) as being formed of a tunnel barrier layer, in lieu of Cu, as is known in the art, in order to provide a TMR head having a magnetoresistance coefficient in the range of nearly 40 percent, as is well known, established and appreciated in the art.

As per claims 20 and 21, although Li et al. (US 2005/0111148 A1) does not expressly disclose wherein a magnetic storage system includes a magnetic media; a writer coupled to the sensor; a slider for supporting the head; and a control unit coupled to the head for controlling operation of the head, Official notice is taken that such systems are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the disclosed head of Li et al. (US 2005/0111148 A1) as being used in its intended environment, i.e., a conventional magnetic system including the conventional components as set forth in claims 20 and 21.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the disclosed head of Li et al. (US 2005/0111148 A1) as being used in its intended

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environment, i.e., a conventional magnetic system including the conventional components as set forth in claims 20 and 21, in order to utilize the advantages of such a CPP-GMR head as espoused by Li et al. (US 2005/0111148 A1) (reduced resistance, significant improvement in the GMR ratio (DR/R), etc.), within its intended operating environment including the magnetic systems and its ubiquitous conventional components, as set forth in claims 20 and 21.

### ***Allowable Subject Matter***

Claims 6, 7, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

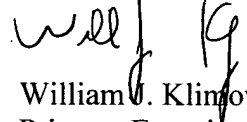
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (571) 272-7577. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Thi Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
William V. Klimowicz  
Primary Examiner  
Art Unit 2627

WJK